REGION 5 PERFORMANCE WORK STATEMENT
CENTRAL SANDS DAIRY CASE
Juneau County, Wisconsin
February 16, 2017

SITE DESCRIPTION

Location

The Central Sands Dairy ("CSD") is an existing large Concentrated Animal Feeding Operation (CAFO) located at 15918 County Rd G, in Nekoosa, Juneau County, Wisconsin. The dairy is located in the Cambrian-Ordivian Aquifer System (COAS). The COAS is mainly comprised of sandstone aquifers, which when combined with the sandy top soil of the Central Sands Region of Wisconsin creates an area with increased ground infiltration. The flow of groundwater within the COAS is generally in the Southern direction. Petenwell Lake (reservoir widening of the Wisconsin River) is south and east of CSD's production site as well as a majority of the application fields within CSD's nutrient management plan (NMP). CSD is in a rural area and residents rely on private wells for potable water.

Background

Citizens are concerned about the groundwater impacts of Central Sand Dairy because of high levels of nitrate in groundwater near drinking water wells. Wisconsin DNR (WDNR) worked with Central Sand Dairy to implement a Phase 1 Monitoring Plan. Groundwater sample analytical results showed very high concentrations of nitrates, in excess of 70 ppm, and levels of ammonia down gradient of the CSD in excess of groundwater preventative action limits.

WDNR is requiring CSD to implement a Phase II Monitoring Plan. The Phase II Monitoring Plan will investigate other sources that could be contributing to elevated nitrate and ammonia levels and insure that Central Sand's WPDES permit conditions are being met. As a condition of the nutrient management plan, irrigation wells are being tested for nitrogen compounds. Some groundwater from the COAS discharges into Petenwell Lake. Petenwell Lake is impaired for Total Phosphorus and in recent years has experience many extensive blue-green algal blooms.

Ex. 5 Deliberative Process (DP)

Ex. 5 Deliberative Process (DP) The goal of this PWS is to develop a groundwater model and predict the fate and transport of pollutants from CSD and its application fields.

LIST OF AVAILABLE INFORMATION

- 10 meter DEM elevation data, grid format;
- Parcel ownership data (GIS format) for both Juneau and Wood counties;
- 2015 USDA NAIP Aerial Photos for Juneau, Wood, and Adams counties;
- SSURGO soils (soil county survey) GIS layers for the same 3 counties, also have the SSURGO geodatabase for the whole state of Wisconsin;
- Application Fields;
- Aquifer test data for select larger municipal wells (Marshfield, Mauston, Nekoosa);
- Land Cover data, both National Land Cover Dataset and Cropland Data Layer;

- Aquifer GIS layer corresponding to the Groundwater Atlas of the US;
- Surface watershed data; and
- CSD well data, including location, depth to groundwater, and pollutant concentrations.

Maps:

- Application Fields;
- Surface Water Flow;
- Street Map with all streets labeled by name;
- Aquifer Properties of Major Public Water Supply wells; and
- CSD Parcel Ownership

REQUIREMENTS AND DELIVERABLES

TASK No.	TASK/ DELIVERABLE
A.1	**Mapping Hydraulic Gradients: A**nalyze and map the hydraulic gradients from the CSD facility to Petenwell Lake. Assemble database with existing chemistry, water level, and geological data, prepare 3D geological models, and prepare Conceptual Site Model summary report including geologic cross-sections, groundwater contour maps, and water levels. A list of available information is provided below.
A.2	**Groundwater flow and transport model:** Develop a 3-D MODFLOW model (possibly using Groundwater Vistas interface), calibrating the model and conducting a sensitivity analysis. Conduct particle release/tracking from various locations to determine time and path it takes to reach the areas of concern, including downgradient wells and Petenwell Lake. The findings and interpretation of the modelling analysis shall be incorporated into a report.
A.3	**Model Training**: Conduct training for EPA staff on how to run the groundwater flow and transport model and/or other scenarios. Assume one full day of training, and development of presentation material.

EPA PRIMARY CONTACTS

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